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10/028,918	12/28/2001	Clemence Siret	Q67910	2840

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EXAMINER

TSANG FOSTER, SUSY N

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 09/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/028,918

Applicant(s)

SIRET ET AL.

Examiner

Susy N Tsang-Foster

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) 15 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-14, drawn to a rechargeable lithium storage cell, classified in class 429, subclass 231.95.
 - II. Claim 15, drawn to a method of fabricating a rechargeable lithium storage cell, classified in class 29, subclass 623.1.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions of Group I and Group II are related as process of making and product made.

The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product can be made by a materially different process such as dissolving a non-fluorinated binder such as a nonfluorinated elastomer in a nonaqueous solvent.

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

4. During a telephone conversation with John Bird (Reg. # 46,027) on 02 September 2003 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-14 and the elastomer species as the binder. After further consideration by the Examiner, the election of species requirement is withdrawn. Affirmation of this election must be made by

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applicant in replying to this Office action. Claim 15 is withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Information Disclosure Statement

6. The information disclosure statement filed on 12/28/2001 has been considered by the Examiner.

Priority

7. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Objections

8. Claims 4 and 14 are objected to because of the following informalities: In claim 4 and 14, the Markush group is improperly written and should include the phrase "selected from the group consisting of". Appropriate correction is required.

Claim Rejections - 35 USC § 112

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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10. Claims 1-14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, the limitation “said binder is a polymer containing no fluorine” is indefinite because it is unclear whether the word “is” is used as a close-ended language or opening-ended language. The word “is” is not a conventional transitional phrase used in claim drafting. For the purposes of prosecution of the instant claim, the limitation is interpreted as “said binder comprises a polymer containing no fluorine” in light of the dependent claims which suggest that this limitation is open-ended. For example, in claim 10, the limitation “said binder includes a mixture of carboxymethylcellulose and an acrylonitrile/butadiene copolymer” is open-ended since the term “include” is synonymous with comprising. Furthermore, dependent claim 3 recites “said binder contains an elastomer” and the term “contain” is also synonymous with the term “comprising”. See MPEP 2111.03 on Transitional Phrases

In claim 3, the limitation “said binder contains an elastomer” is indefinite because it is unclear if the elastomer refers to the polymer containing no fluorine recited in claim 1.

In claim 6, the limitation, “said binder contains a cellulose compound” is indefinite because it is unclear if the cellulose compound refers to the polymer containing no fluorine recited in claim 1.

In claim 9, the limitation, “said binder includes a mixture of an elastomer and a cellulose compound” is indefinite because it is unclear if the mixture refers to the polymer containing no fluorine recited in claim 1.

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Claims depending from claims rejected under 35 USC 112, second paragraph are also rejected for the same.

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

12. Claims 1-4, 6, 7, 9, 11, and 14 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Watanabe et al. (US 6,489,062 B1).

See abstract; col. 1, lines 7-13; col. 2, lines 50-56; col. 4, lines 4-10; col. 7, lines 27-67; col. 8, lines 1-42; col. 12, lines 54-61 of the reference.

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claims 5, 8, 12, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe et al. (US 6,489,062 B1).

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Watanabe et al. disclose all the limitations of claims 5, 8, 12, and 13 (see above) except the specific portions of the elastomer and/or cellulose compound in weight percent in the binder as recited in the claims.

However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust the amount of elastomer and/or cellulose compound in the binder mixture having the claimed weight percentages for each component in the binder mixture because it is within the skill of the artisan to adjust the amount of binder components in a mixture to the appropriate viscosity for ease of shaping the electrode mixture containing the binder when manufacturing the electrode.

Furthermore, it has been held in the courts that when the general conditions of a claim are similarly disclosed in the prior art, it is not inventive to optimize general conditions as concentration. In re Aller, Lacey and Hall, 105 USPQ 233,235.

15. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe et al. (US 6,489,062 B1) in view of Shizuka et al. (US 6,159,637).

Watanabe et al. disclose all the limitations of claim 10 except that the binder includes a mixture of carboxymethylcellulose and an acrylonitrile/butadiene copolymer. Watanabe et al. do disclose that the binder in the negative electrode can be a mixture of a polysaccharide such as carboxymethylcellulose and polymers having rubber elasticity such as ethylene-propylene-diene (EPDM), styrene-butadiene rubber (SBR), and polybutadiene (see col. 7, line 56 to col. 8, line 5).

Shizuka et al. teach that the negative and positive electrodes of a rechargeable lithium storage cell comprises a binder that may be EPDM, SBR, or NBR (acrylonitrile/butadiene copolymer) (col. 7, lines 29-51).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use acrylonitrile/butadiene copolymer (NBR) in the binder mixture of Watanabe et al. as the polymer having rubber elasticity because NBR is compatible with a lithium battery environment and it is chemically equivalent to SBR and EPDM disclosed by Shizuka et al. as a binder in a lithium battery.

16. Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Herreyre et al. (US 6,399,255 B2) in view of Watanabe et al. (US 6,489,062 B1).

Herreyre et al. disclose a rechargeable lithium storage cell (col. 1, lines 5-16) including a positive electrode comprising an active material selected from the group consisting of a lithiated oxide of a transition metal, such as nickel, cobalt, manganese, vanadium, and iron (col. 4, lines 51-56) and a negative electrode comprising an active material selected from the group consisting of graphite, coke, and carbon black and a binder (col. 2, lines 46-56; col. 4, lines 44-50). The binder can be an elastomer selected from the group consisting of a copolymer of acrylonitrile and butadiene and a copolymer of styrene and butadiene and the elastomer is 30 to 70 wt% of the binder (col. 3, lines 50-57). In an another embodiment, the binder contains a cellulose compound such as carboxymethyl cellulose and the cellulose compound is 30 to 70 wt% of the

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binder (col. 3, lines 58-67). In another embodiment, the binder is a mixture of an elastomer and a cellulose compound and the elastomer contained in the mixture lies in the range of from 30 to 70 wt% of the binder and the cellulose compound lies in the range of 30 to 70 wt% of the binder (col. 4, lines 5-17). Specific examples of mixtures for a binder are a mixture of a copolymer of acrylonitrile and of butadiene with carboxymethyl cellulose and a mixture of a copolymer of styrene and of butadiene and carboxymethyl cellulose (col. 4, lines 1-12).

Herreyre et al. do not disclose that the negative electrode active material can be a mixed oxide of lithium and titanium with the general formula $\text{Li}_x\text{Ti}_y\text{O}_4$ in which $0.8 \leq x \leq 1.4$ and $1.6 \leq y \leq 2.2$.

Watanabe et al. teach that in a lithium rechargeable cell, a negative electrode containing lithium titanate having a spinel structure given by the general formula $\text{Li}_4\text{Ti}_5\text{O}_{12}$ which reduces stoichiometrically to $\text{Li}_{4/3}\text{Ti}_{5/3}\text{O}_4$ having an electrode potential of about 1.5 to 2.5 V (col. 2, lines 50-65 and col. 4, lines 23-25) used in conjunction with positive electrode materials selected from the group consisting of LiCoO_2 , LiNiO_2 , or LiMn_2O_4 gives a battery that allows reflow soldering during manufacture of the battery because these electrode materials are thermally stable and do not react with the electrolyte in contrast with the use of a carbon material having lithium in contact therewith or doped electrochemically with lithium that reactant with the electrolyte at reflow temperatures exceeding 200 °C and the reaction suppresses the amount of lithium that is doped in the carbon and the capacity is sacrificed (col. 3, lines 55-66 and col. 4, lines 4-14).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the carbon active material in the negative electrode of Herreyre et al. with lithium titanate because lithium titanate is thermally stable and does not react with the electrolyte

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during reflow soldering of the battery components and capacity of the battery does not deteriorate during reflow soldering of the battery.


Conclusion

Any inquiry concerning this communication or earlier communications should be directed to examiner Susy Tsang-Foster, Ph.D. whose telephone number is (703) 305-0588. The examiner can normally be reached on Monday through Friday from 9:30 AM to 7:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at (703) 308-2383. The phone number for the organization where this application or proceeding is assigned is (703) 305-5900.

The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

st/ 

Susy Tsang-Foster
Primary Examiner
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